

**SYNOPSIS OF THE MEXICAN AND GUATEMALAN GENERA *RUTELISCA* BATES AND *METAPACHYLUS* BATES (COLEOPTERA: SCARABAEIDAE: RUTELINAE) WITH COMMENTS ON CLASSIFICATION OF THE SUBTRIBE RUTELINA**

MARY LIZ JAMESON

W-436 Nebraska Hall, University of Nebraska State Museum, Lincoln, NE 68588-0514  
U.S.A. (e-mail: mjameson1@unl.edu)

---

*Abstract.*—The Mexican and Guatemalan genera *Rutelisca* Bates and *Metapachylus* Bates comprise the “*Rutelisca* lineage,” a hypothesized monophyletic group in the tribe Rutelini (Coleoptera: Scarabaeidae: Rutelinae). Both genera were considered members of the subtribe Rutelina (tribe Rutelini), but phylogenetic analyses demonstrated that this subtribe is polyphyletic. Classification of the subtribe Rutelina is discussed, and taxonomic synopses are provided for the genera *Rutelisca* and *Metapachylus*.

*Key Words:* Scarabaeidae, Rutelinae, Rutelina, *Rutelisca*, *Metapachylus*, classification, taxonomy, Mexico, Guatemala

---

The little-known genera *Rutelisca* Bates and *Metapachylus* Bates have not been reviewed or revised taxonomically since their description or revised taxonomically since their description by Bates (1888, 1889). Species in both genera are black, moderate-sized scarabs (10–15 mm) that are distributed from Mexico to Guatemala and are found in tropical montane forests and cloud forests. This research provides a synopsis of the species in the genera *Rutelisca* and *Metapachylus* and discusses the historical and current classification of these poorly studied taxa.

Bates (1888, 1889) described *Metapachylus* and *Rutelisca* in the *Biologia Centrali Americana*. He assigned both genera to an “unindicated group” that he considered to be intermediate between the subfamilies Dynastinae and Rutelinae. In effect, he suggested that no taxon existed for this unique group. In his discussion of the genus *Metapachylus*, Bates (1889: 412) noted that:

“... the interesting form on which this

genus is founded partakes of the characters of *Pachylus*<sup>1</sup>, *Oryctomorphus*<sup>2</sup>, and *Parastasia*<sup>3</sup>, with the allied Indian forms *Didrepanophorus*<sup>4</sup>, *Peperonota*<sup>5</sup>, & c., genera [that are] widely separated in the received classification. It has much also in common with the genus *Rutelisca*, which would be better placed in its vicinity than in the group Rutelina, the tarsal claws not being really unequal in length, their different curvature only making them appear so. The North-

---

<sup>1</sup> *Ottokelleria* d’Andretta and Martínez 1957 (Rutelinae: undesignated tribe and subtribe) is the valid name for *Pachylus* Burmeister 1847 (a junior homonym of *Pachylus* Kollar 1839)

<sup>2</sup> *Oryctomorphus* Guérin-Ménéville 1830 (Dynastinae: Pentodontini)

<sup>3</sup> *Parastasia* Westwood 1842 (Rutelinae: Rutelini: Parastasiina)

<sup>4</sup> *Didrepanophorus* Woodmason 1878 (Rutelinae: Rutelini: Parastasiina)

<sup>5</sup> *Peperonota* Westwood 1847 (Rutelinae: Rutelini: Parastasiina)

American genus *Polymoechus*<sup>6</sup> apparently belongs to the same hitherto unindicated group of genera.”

Bates clearly recognized the shortcomings of the accepted classification of his era, and he recognized shared characters that united the “unindicated group of genera.” However, rather than creating a new taxon he placed the genera *Metapachylus* and *Rutelisca* in the subtribe Rutelina (Rutelinae: Rutelini), and he retained the classification of other aforementioned genera. Ruteline systematists Ohaus (1918, 1934) and Machatschke (1972) maintained *Metapachylus* and *Rutelisca* as members of the subtribe Rutelina. Classifications of genera and species in this “unindicated group” have vacillated between the subfamilies Dynastiinae, Rutelinae, and Melolonthinae (i.e., *Oryctomorpha*, *Ottokelleria* [= *Pachylus* Burmeister], genera of Parastasiina, and genera of Rutelina). The nomenclatural instability of these genera is indicative of classification problems that require further analyses.

My recent work on the phylogeny of the tribe Rutelini and subtribe Rutelina (Jameison 1998) demonstrated that several subtribes in the Rutelini were not monophyletic, including the subtribe Rutelina (to which the genera *Metapachylus* and *Rutelisca* belong). The subtribe Rutelina was composed of three, independent lineages. One of these lineages was the “*Rutelisca* lineage” which was composed of the genera *Metapachylus* and *Rutelisca*. This lineage was hypothesized to be monophyletic and closely related to Old World taxa, including those mentioned by Bates (*Parastasia*, *Peperonota*, *Didrepanophorus*). Thus, Bates’ century-old observation returns us to the problematic relationships and classification of these poorly studied taxa.

#### TAXONOMIC MATERIAL

Specimens examined for this study were provided by 14 institutions and private collections. A total of 103 specimens, including type specimens, formed the basis of this research. Acronyms for lending institutions follow Arnett et al. (1993).

- |      |  |
|------|--|
| BMNH | The Natural History Museum, London, England (Malcolm Kerley)   |
| CNCI | Canadian National Collection of Insects, Ottawa, Ontario, Canada (Jean McNamara, Josee Poirier)  |
| DJCC | Daniel J. Curoe Collection, Palo Alto, CA, USA (Daniel J. Curoe)   |
| FMNH | Field Museum of Natural History, Chicago, IL, USA (Alfred Newton)  |
| FREY | Georg Frey Collection formerly at Zoologische Staatssammlung, Munich, Germany (Gerhard Scherer, Max Kuhbänder, Martin Baer), now at Naturhistorisches Museum, Basel, Switzerland |
| HAHC | Henry and Anne Howden Collection, Ottawa, Canada (Henry Howden)  |
| IEXA | Instituto de Ecología, Xalapa, Mexico (Miguel A. Morón)  |
| KSEM | University of Kansas Snow Entomological Museum, Lawrence, KS, USA (Steve Ashe, Rob Brooks)   |
| MCZC | Museum of Comparative Zoology, Cambridge, MA, USA (Stephan Cover)  |
| MNHN | Muséum National d’Histoire Naturelle, Paris, France (Jean Menier)  |
| MAMC | Miguel A. Morón Collection, Xalapa, Mexico (Miguel A. Morón)   |
| USNM | National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (Gloria House)  |
| ZMHB | Museum für Naturkunde der Humboldt Universität zu Berlin.  |

<sup>6</sup> *Parastasia* Westwood (Rutelinae: Rutelini: Parastasiina) is the valid name for *Polymoechus* LeConte 1856

Berlin, Germany (Manfred Uhlig, Joachim Schulze)

UNAM Colección Entomología, Instituto de Biología, Universidad Nacional Autónoma de México, México, DF (Silvia Santiago)

DEFINITION OF TAXONOMIC CHARACTERS  
AND CHARACTER EXAMINATION

Internal and external morphological features formed the basis of this work. Specimens were examined with the aid of a dissecting microscope (6.5 to 50 power) and fiber-optic lights. Internal sclerotized structures were dissected after relaxing the specimen in hot water. Heavily sclerotized parts were soaked in a dilute solution (about 15%) of potassium hydroxide and neutralized in a dilute solution (about 15%) of acetic acid. Mouthparts, wings, and genitalia were studied and card-mounted or placed in a glycerin-filled vial beneath the specimen.

Species are characterized by combinations of characters including the form of the clypeus, maxillary palps, and claws; sculpturing of the head, pronotum, elytra, and pygidium; and form of the male genitalia. For measurements, I used an ocular micrometer. The following standards are used. Body length: measured from the apex of the clypeus to the apex of the pygidium. Widest body width: measured at mid-elytra. Puncture density: defined as dense if punctures are nearly confluent to less than two puncture diameters apart, moderately dense if punctures are between two to six puncture diameters apart, and sparse if punctures are separated by more than six puncture diameters. Length of setae: defined as moderately long if between 0.2–0.6 mm and long if between 0.6–1.0 mm. Elytral sutural length: measured from the base of the elytral suture to apex. Elytral discal striae: defined as the striae located between the first elytral stria (laterad of the sutural stria) and the elytral humerus.

SYSTEMATICS AND CLASSIFICATION OF THE  
“*RUTELISCA* LINEAGE”

The “Group Rutelina” (referred to as a subtribe by Ohaus [1918, 1934], Black-

welder [1944], and Machatschke [1972]) was created by Bates (1888, 1889) for taxa that had previously been included in Burmeister’s (1844) “Rutelidae Genuini” and Lacordaire’s (1856) “Rutélides vraies.” The generic composition of the subtribe has not been stable since its inception due to the inclusion and exclusion of the genera *Pelidnota* MacLeay (Rutelini: Pelidnotina or Rutelina, New World) and *Rutelarcha* Waterhouse, *Lutera* Westwood, and *Cyphelytra* Waterhouse (all Rutelini: Parastasiina or Rutelina, all Old World). In conducting a revision of the subtribe Rutelina (Jameson 1998), it became apparent that the phylogenetic limits of the subtribe and the genera in the subtribe were incorrect in the current classification (Machatschke 1972).

As with many subtribes in the tribe Rutelini, subtribal groupings are based on vague diagnoses and characters that are not constant among all genera. Because of a lack of subtribal definition that is based on shared, derived characters, genera have been placed and displaced within subtribes. Taxa in the subtribe Rutelina seemed to have been grouped by Ohaus (1934) based on robust body form and similarity in color; characters that are not reliable for grouping taxa.

Because subtribal groupings are unstable, the heuristic power of classifications (e.g., in hypotheses of evolution and biogeography) and the utility of most taxonomic keys (which are based on shared characters) is greatly diminished. Using existing keys to tribes and subtribes (Ohaus 1934, Jameson 1990), and based on the current classification, neither *Rutelisca* nor *Metapachylus* will correctly key to the subtribe Rutelina. *Rutelisca* will key to the subtribe Parastasiina based on its frontoclypeal suture that is incomplete medially and elevated laterally and pronotal basal bead that is lacking. Based on the characters in the key, *Metapachylus* will key to the subtribe Didrepanephorina (a monogeneric subtribe from Indochina). The source of this problem is that current classification is composed of hetero-

geneous assemblages of taxa; that is, they are composed of paraphyletic groups.

Phylogenetic analysis of exemplar genera in the tribe Rutelini (Jameson 1998) demonstrated that several subtribes were not monophyletic, including the subtribe Rutelina. All species and genera of the Rutelina (as defined by Machatschke [1972]) were included in the analyses. Results demonstrated that the subtribe Rutelina was composed of three, independent clades: the "*Rutelarcha* lineage," the "*Rutelisca* lineage," and the "*Rutela* lineage." Based on the results of the analyses, I suggested classification changes in the tribe, one of which was eliminating the polyphyletic subtribe Rutelina.

The genera *Metapachylus* and *Rutelisca* comprise the "*Rutelisca* lineage." Basal to the "*Rutelisca* lineage" is a clade composed of the Old World genera *Fruhstorferia* Kolbe (subtribe Fruhstorferiina in Machatschke [1972]), *Kibakoganea* Nagai (subtribe Fruhstorferiina [Nagai 1984, Miyake and Muramoto 1992]), *Ceroplophana* Gestro, *Dicaulocephalus* Gestro, and *Peperonota* Westwood (all in the subtribe Parastasiina in Machatschke [1972]). Apical to the "*Rutelisca* lineage" is either a clade composed only of the genus *Parastasia* (primarily Old World with one species in the New World) or a clade composed of the Old World genera *Rutelarcha*, *Cyphelytra*, and *Lutera* (all in the subtribe Parastasiina in Machatschke [1972]). The placement of the genus *Parastasia* was not resolved in the analysis (either basal to the clade that included *Fruhstorferia*, *Ceroplophana*, *Dicaulocephalus*, and *Peperonota* or apical to the "*Rutelisca* lineage"), but inclusion of additional taxa such as *Oryctomorphus* (Dynastinae: Pentodontini), *Alvarengius* Frey (Melolonthinae), *Ottokelleria* (Rutelinae: *incerta sedis*), *Desmonyx* Arrow (Rutelinae: Rutelini), *Mesystoechus* Waterhouse (Rutelinae: Anoplognathini), and *Pseudogeniates* Ohaus (Rutelinae: Rutelini) may help to resolve the problem of rela-

tionships of the basal lineages of the tribe Rutelini.

My recent work on the phylogeny of the Rutelina (Jameson 1998) corroborates Bates' (1888, 1889) suggestion that the genera *Rutelisca* and *Metapachylus* are, indeed, "intermediate between the true Rutelae and Cyclocephali." Bates was the first to recognize the affinities of these poorly known taxa with the Parastasiina (Rutelinae: Rutelini) and Cyclocephalini (Dynastinae). Analyses of the relationships of the Rutelini resulted in questions of possible paraphyly between the basal Rutelini and the subfamily Dynastinae. Systematists have long noted "affinities" that the genus *Parastasia* and its allies share with the Dynastinae and Rutelinae. Bates (1888: 270) commented that the genus *Rutelisca* was "... an interesting form, intermediate between the true Rutelae [Rutelinae: Rutelini] and the Cyclocephali [Dynastinae: Cyclocephalini], and having a marked affinity with the Indian and Malayan genus *Parastasia*." Bates commented that the "unidentified group of genera" should be placed between the Rutelinae and Dynastinae, and he did not assign the group to either subfamily (Arrow 1907). Arrow (1907) also noted that characters in genera such as *Oryctomorphus*, *Desmonyx*, *Parastasia*, and *Metapachylus* (what he calls the "*Parastasia* Group") link the subfamilies Dynastinae and Rutelinae, effectively obscuring the limits of the subfamilies. Lack of well-defined characterizations of the subfamilies has exacerbated this classification problem, resulting in some genera that have been placed in both groups (i.e., *Oryctomorphus* and *Peltonotus* Burmeister).

The "*Rutelisca* lineage" can be characterized as follows: Mandible with one anteriorly projecting tooth (Figs. 2a-c). Foretibia with base notched (Fig. 3a). Meso- and metatarsal claws widely cleft in males and females (e.g., Fig. 3f). Frontoclypeal suture elevated laterally or base of clypeus elevated. Unguitractor plate and associated setae exposed beyond base of tarsal claw (Figs.



Fig. 1. *Rutelisca flohri* (male).

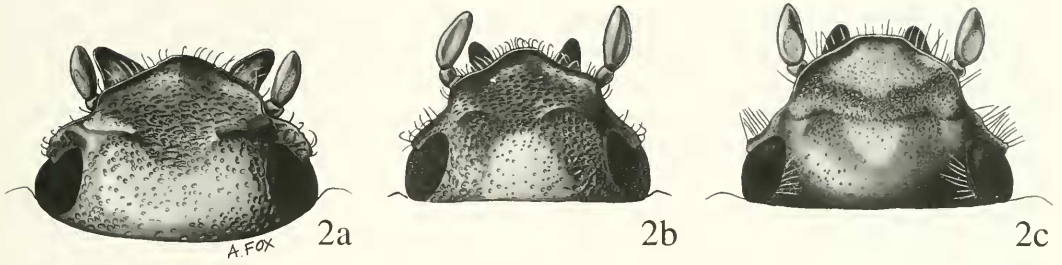


Fig. 2. Dorsal view of heads showing differences in palps, sculpturing, and clypeal apices. a, *Rutelisca durangoana*. b, *R. flohri*. c, *Metapachylus sulcatus*.

3e–f). Pronotum lacking basal bead. Maxilla with poorly developed, peg-like teeth.

KEY TO THE “RUTELISCA LINEAGE”: GENERA  
*METAPACHYLUS* AND *RUTELISCA*

- 1. Elytra sulcate, with 5–6 impressed, punctate striae that nearly reach the elytral apex and base (Fig. 5) . . . . . *Metapachylus sulcatus* Bates
- Elytra not sulcate, without impressed striae (Fig. 1) *Rutelisca*, . . . . . 2
- 2. Elytra lacking punctate striae. Maxillary palp in dorsal view with longitudinal flattened area extending from base to middle of palp (Fig. 3h). Apex of clypeus broadly parabolic (Fig. 2a) . . . . . *R. durangoana* Ohaus
- Elytra with weak punctate striae. Maxillary palp in dorsal view with longitudinal flattened area extending from base to apical third or fourth (Fig. 3g). Apex of clypeus narrowly parabolic (Fig. 2b) . . . . . *R. flohri* Bates

Genus *Rutelisca* Bates 1888

(Figs. 1, 2a–b, 3a–b, d–h, 4a–b, 6)

*Rutelisca* Bates 1888: 270.

Type species: *Rutelisca flohri* Bates 1888: 270–271, 408, by monotypy.

Description.—Scarabaeidae, Rutelinae, Rutelini. *Form* (Fig. 1): Elongate oval, sides subparallel, pygidium exposed beyond apices of elytra, apex of elytra broadly rounded. Length from apex of clypeus to apex of pygidium 12.0–20.0 mm; width at mid-elytra 5.0–9.5 mm. *Head* (Figs. 2a–b): Disc of frons and clypeus in lateral view nearly flat, clypeus with margins and apex reflexed. Frons and clypeus variably sculptured, punctate and rugose. Frontoclypeal suture cariniform, incomplete at middle. Eye canthus weakly cariniform. Interocular

width 4.0–4.5 transverse eye diameters. Clypeal apex rounded, reflexed, lacking bead. Mandibles with 1 recurved, apical tooth, apex blunt; 2–4 inner scissorial teeth; molar region moderate to narrow in width. Labrum rounded or quadrate. Maxilla with weak, conical or peg-like teeth; terminal segment of palpus (Figs. 3g–h) with or without dorsal, longitudinal flattened region (surface shagreened). Mentum with apex reflexed into oral cavity. Antenna 10-segmented with 3-segmented club; club subequal in length to segments 1–7 combined. *Pronotum*: Widest at middle, apicomedia-ly weakly protuberant, basolaterally feebly angled anteriorly (Fig. 1). Variably sculptured, shagreened and punctate. Marginal bead complete anteriorly and laterally, incomplete basally (to slightly beyond basal angle). *Scutellum*: Parabolic, wider than long; base declivous at elytral base. *Mesepimeron*: Apex entirely hidden by base of elytra in dorsal and lateral views. *Elytra*: Variably sculptured, shagreened and with or without longitudinal, punctate striae; punctures simple. Epipleuron from base to mid-metacoxa with shelf; epipleuron from mid-metacoxa to apex beaded. Apex of elytra weakly rounded, beaded. Sutural angle with apex square or weakly rounded. Elytral sutural length about 7.0 times length of scutellum. *Propygidium*: Hidden or weakly exposed. *Pygidium*: Semitriangular, about twice as wide as long at middle. Variably sculptured, shagreened and rugose. Margins beaded. Apex rounded or weakly quadrate. *Venter*: Prosternal keel triangular; apex

projecting anteroventrally at about  $35^\circ$  with respect to ventral plane; apex produced to level of protrochanter, blunt; basomedially protuberant. Mesometasternal keel lacking. Sternites 1–4 subequal in width in male and female. In lateral view, male sternites flat, female sternites weakly convex. Last sternite with apex weakly bisinuate in male, quadrate in female. *Legs*: Profemur with

rounded, dilated apex (Fig. 3a). Protibia with 3 teeth in apical third, basal tooth weakly removed from apical teeth; base with protibial notch (Fig. 3a). Modified foreclaw of male widely split apically (Fig. 3e), subequal in length to tarsomere 5, twice as thick as unmodified claw, apical tooth present or absent. Modified foreclaw of female widely cleft (Fig. 3f), both claws

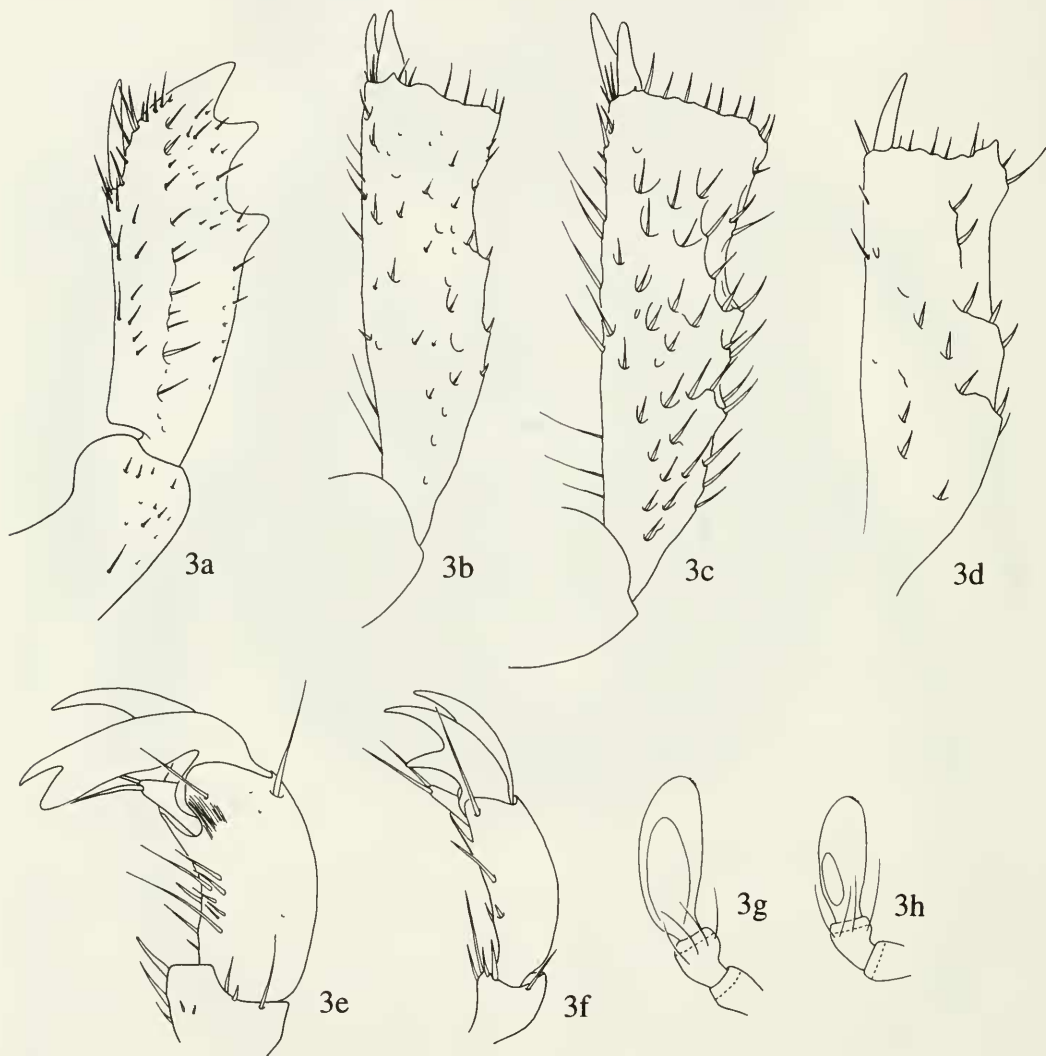


Fig. 3. Diagnostic characters for *Rutelisca* and *Metapachylus*. a. Apex of forefemur (rounded and dilated at apex) and foretibia (with base notched) of *R. durangoana* (male). b–c. Metatibiae of *R. flohri* (b) and *M. sulcatus* (c) (showing form and apex with seta-like spinulae). d. Mesotibia of *Rutelisca* (showing form and apex with median, tooth-like projection). e–f. Foretarsi of male *R. durangoana* (e) female *R. durangoana* (f) (showing form of foretarsomeres 4–5, form of the claws, and form of the unguitactor plate). g–h. Maxillary palpus (dorsal view) of *R. flohri* (g) and *R. durangoana* (h) (showing shape and longitudinal, flattened area).

subequal in width. Unguitractor plate laterally flattened, exposed beyond tarsomere 5; apex with 2 long setae. Mesotibia (Fig. 3d) with sides subparallel, apex weakly divergent; external edge with 1–2 carinae; inner apex with 2 spurs; apex with 1 median tooth-like projection that extends to about  $\frac{1}{4}$  length of tarsomere 1, 2–6 seta-like spinulae present between inner spurs and median tooth, and 2–6 spinulae present laterad of median tooth; spinulae short and long. Meso- and metatarsomere 4 with 2 spinulae apicomediaally and 1 seta-like spinule laterad of spinulae. Meso- and metatarsal claws of male and female widely cleft. Metacoxal apex laterally square or rounded. Metatrochanter with apex not produced beyond posterior border of femur. Metatibia (Fig. 3b) with sides subparallel, apex weakly divergent; external edge with 1–2 carinae; inner apex with 7–10 seta-like spinulae; spinulae both short and long. *Parameres*: Symmetrical (Figs. 4a–b). *Female genitalia*: Not diagnostic.

**Diagnosis.**—Members of the genus *Rutelisca* differ from other genera in the tribe Rutelini by the following characters: mandibles with one recurved, apical tooth (Figs. 1, 2a–b); mentum with apex reflexed into oral cavity; frontoclypeal suture incomplete medially, cariniform laterally; apex of metatibia with spinules (Fig. 3b); profemur with rounded, dilated apex (Fig. 3a); protibial base with notch (Fig. 3a); modified claw of meso- and metatarsus in male and female widely cleft (Fig. 3f).

**Distribution** (Fig. 6).—Mexico.

**Natural history.**—Adults of *Rutelisca* are not commonly encountered but have been collected under logs, in the soil, under rotting bark, and at lights. Rarity of montane, pine-oak habitat in the Pacific region of Mexico may limit the range of *Rutelisca* species (Morón 1994). The larva and pupa of one species, *R. durangoana* Ohaus, were described by Morón and Deloya (1991).

**Remarks.**—Bates (1888: 270) commented that the genus *Rutelisca* is “. . . an interesting form, intermediate between the

true Rutelae and the Cyclocephali, and having a marked affinity with the Indian and Malayan genus *Parastasia*.” For lack of a better association, Bates (1888) placed the genus in the subtribe Rutelina. However, in the Supplement to the *Biologia*, Bates (1889: 412) assigned the genus to an “unindicated group” (including *Ottokelleria* [= *Pachylus*], *Oryctomorphus*, *Parastasia*, *Didrepanephorus*, *Peperonota*, and *Metapachylus*) which he placed between the Rutelinae and Dynastinae. Morón et al. (1997) stated that the position of the genus *Rutelisca* in the Rutelini required revision.

Based on my phylogenetic analyses (Jameson 1998), the genus *Rutelisca* is most closely related to the genus *Metapachylus*. Additional analyses of the basal Rutelini that include such genera as *Ottokelleria*, *Alvarengius*, *Desmonyx*, *Mesystoechus*, *Pseudogeniates* (genera not included in Jameson [1998]), *Oryctomorphus*, and genera of Heterosternina may yield new views of relationships among these poorly known taxa and “affinities” with the Dynastinae.

The genus *Rutelisca* is one of several Mexican scarab genera that are endemic to the Pacific slopes of Mexico (Morón 1994). Other scarab endemics include the genera *Callirhinus* (Rutelinae), *Ischnoscelis*, and *Neoscelis* (both Cetoniinae) (Morón 1994). Morón (1994) hypothesized that these endemic taxa are relictual elements of the Old World fauna.

*Rutelisca durangoana* Ohaus  
(Figs. 2a, 3e–f, h, 4a, 6)

*Rutelisca durangoana* Ohaus 1905: 312.

**Types.**—Lectotype male (here designated) at ZMHB with label data “Canelas, Durango,” male genitalia and mouthparts card mounted, “*Rutelisca durangoana* Ohaus” (red label, handwritten), with my lectotype label. Lectoallotype at ZMHB labeled, “Mexico, Canelos, R. Becker,” “♀,” “*Rutelisca durangoana* cotype ♀ Ohs.” (red la-



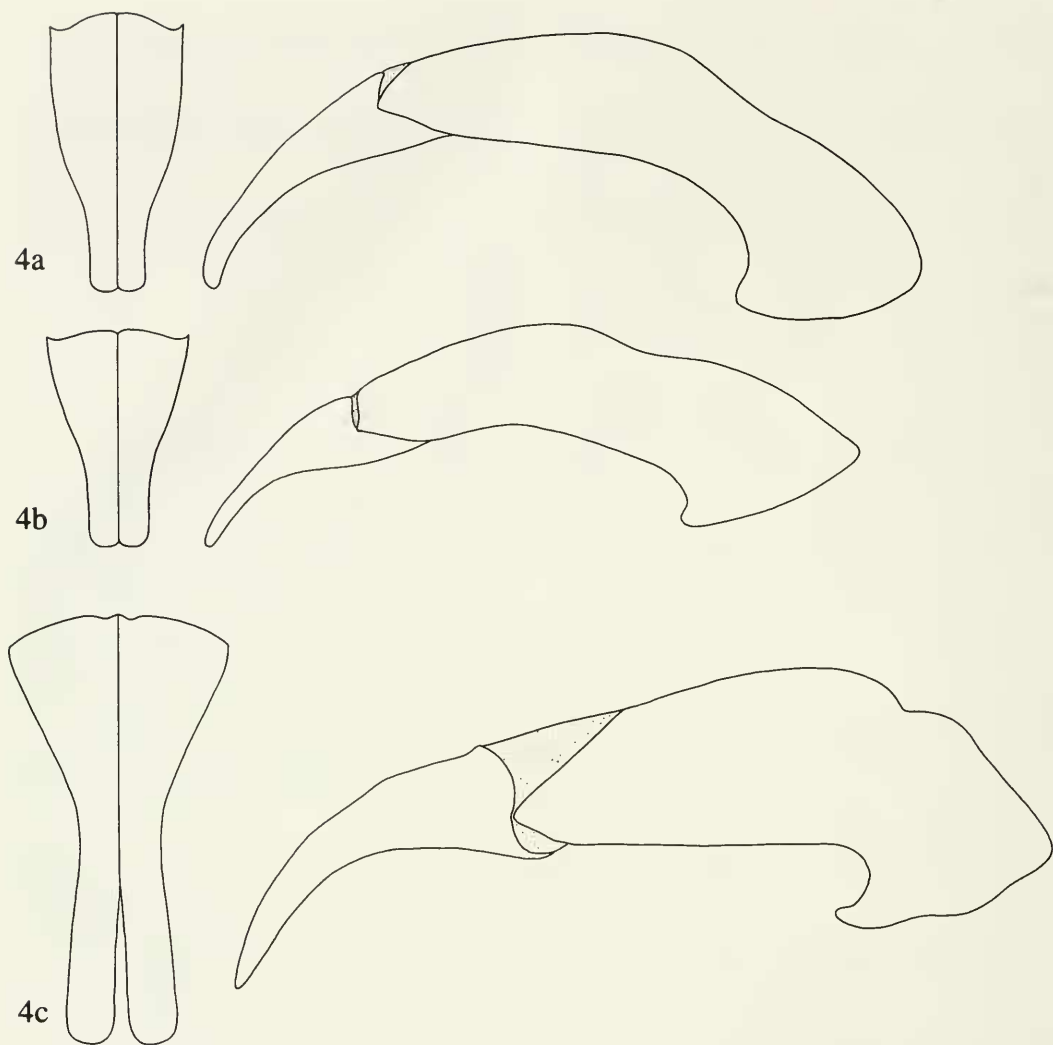


Fig. 4. Male genitalia in caudal view (left) and lateral view (right). a, *Rutelisca durangoana*. b, *R. flohri*. c, *Metapachylus sulcatus*.

bel, handwritten), with my lectoallotype label.

**Description.**—Length 14.0–19.0 mm. Width at elytral humerus 6.9–9.3 mm. *Color*: Dorsum, venter, and appendages castaneous to black, with or without orange-brown maculae; frons (males) with orange-brown macula from base to disc, anterior border of macula strongly biarcuate. *Head* (Fig. 2a): Frons moderately densely punctate to rugopunctate; area of macula (base and disc) moderately densely punctate, lateral and apical regions confluent punctate

to rugopunctate; punctures 0.02 (at base)–0.08 (at apex) mm. Clypeus with surface rugopunctate; shape semicircular; base and sides moderately reflexed, apex broadly reflexed. Mandibles with 1 apical, recurved tooth; scissorial region with 2–3 poorly developed teeth; molar region narrow. Labrum rounded apically. Maxilla with 6 poorly developed teeth; terminal segment of palpus rod-shaped, with flattened region from base to mid-palpus (Figs. 2a, 3h). Mentum with apex quadrate, width of apex about  $\frac{1}{2}$  width of base. *Pronotum*: Closely

shagreened, moderately densely punctate; punctures 0.01–0.05 mm; larger punctures on sides. *Elytra*: Closely shagreened, moderately densely punctate, without punctate striae; punctures minute–0.07 mm, randomly distributed. *Pygidium*: Closely shagreened; with close, weakly undulating wrinkles from base to apex, basolaterally weakly rugose. Apex with moderately long to long setae; setae tawny to rufous. *Venter*: Sternite 5 at apex with broad intersegmental membrane, membrane about  $\frac{1}{4}$  to  $\frac{1}{2}$  width of sternite 5. Sternite 6 subequal in length to sternite 4. Last sternite with surface weakly, undulatingly wrinkled to weakly rugose; apical margin setigerous; setae tawny, moderate in length. *Legs*: Protarsomere 5 of male subequal to tarsomeres 1–4. Modified foreclaw of male widely split apically (Fig. 3e); subequal in length to tarsomere 5; twice as thick as modified claw; apical tooth present. Modified foreclaw of female widely cleft (Fig. 3f); claws subequal in width. Unguitractor plate laterally flattened, exposed beyond tarsomere 5; apex with two long, stiff, tawny setae. Mesotibia with sides subparallel, apex weakly divergent; external edge with weak carina in basal  $\frac{1}{2}$ , 1 carina in apical  $\frac{1}{3}$  (e.g., Fig. 3d); apex with 1 median, tooth-like projection (extends to about  $\frac{1}{4}$  length of tarsomere 1), 2 inner spurs, 4–5 seta-like spinulae between spur and median tooth, 2–4 spinulae laterad of median tooth; spinulae short to long, rufous. Meso- and metatarsal claws of male and female widely cleft (e.g., Fig. 3f). Metatibia with sides subparallel; external edge with 1 carina in basal  $\frac{1}{2}$ , 1 carina in apical  $\frac{1}{3}$ ; apex without corbel, with 2 inner spurs (spurs equal in width in male; ventral spur thicker than dorsal spur in female), with 7–10 seta-like spinulae; spinulae short or long, reddish. *Parameres*: Fig. 4a.

**Diagnosis.**—*Rutelisca durangoana* is separated from *R. flohri* based on the elytral striae (Fig. 1) (punctate striae lacking in *R. durangoana*, present in *R. flohri*); terminal segment of the maxillary palp that is rod-shaped with a weak, longitudinal, flattened

area that extends from the base to the middle of the palp (Fig. 3h) (in *R. flohri*, the terminal segment of the maxillary palp is kidney bean-shaped with a longitudinal flattened area that extends from the base to the apical third or fourth [Fig. 3g]); the broadly parabolic clypeal apex (Fig. 2a) (in *R. flohri*, the clypeal apex is narrowly parabolic [Fig. 2b]); male with orangish-brown maculae on the frons only (in *R. flohri*, maculae are present on the frons, lateral margins of pronotum, bases and apices of the elytra [Fig. 1]); and female that lacks an orangish-brown macula on the frons (macula present on the frons of *R. flohri* females).

**Distribution** (Fig. 6).—Mexico, Sonora south to Michoacán. I have examined 2 types (see locality data under type data) and 50 other specimens from the following localities: AGUASCALIENTES (1): La Congoja [1 IEXA]. DURANGO (19): Arroyo Hondo nr. La Flor [1 ♀ CNCI], Canelos [2 ♀ 5 ♂ ZMHB], La Borrega [1 ♀ ZMHB], Reserva Biosfera La Michilia [1 ♀ DJCC, 8 MAMC, 1 IEXA]. MICHOACÁN (1): Uruapan [1 ♀ ZMHB]. SINALOA (1): Badiragua-to [1 IEXA]. SONORA (7): Yécora [3 MAMC, 2 IEXA, 1 ♂ 1 ♀ CNCI]. ZACATECAS (23): Chalchihuites (8 mi. S) [2 ♂ 1 ♀ FMNH], Chalchihuites (15 mi. SW) [1 ♂ FMNH], Fresnillo (61 mi. W) [3 ♂ 1 ♀ FMNH], Hac. Laguna Balderama (25 mi. W Fresnillo) [1 ♂ FMNH], Milpilla (13 mi. W) [6 ♂, 6 ♀ FMNH], Monte Escobido (4 mi. W) [1 ♂ 1 ♀ FMNH].

**Temporal distribution.**—June (13), July (37), August (3), September (4) (label data and Morón 1981).

**Remarks.**—Adults of *R. durangoana* have been collected at incandescent lights (Morón 1981, label data), on the bark of rotting oak (*Quercus* sp.) (Morón 1981, Ohaus 1934, label data), and under yellow pine bark (*Pinus* sp.) (label data). Due to the paucity of specimens in collections and the seemingly restricted distribution of the species, Morón (1981) hypothesized that *R. durangoana* was endemic to the state of Durango. Additional records (Morón et al.

1997) showed that the species was more widespread, being found in states of Sinaloa, Durango, and Aguascalientes. This research further extends the range of the species. *Rutelisca durangoana* is found in the Sierra Madre Occidentale and the westernmost Transverse Volcanic Belt (the states of Sonora, Sinaloa, Durango, Zacatecas, Aguascalientes, and Michoacán). The species is recorded at elevations ranging from 1,540 to 2,560 meters.

Adults and larvae have been observed in rotten logs of oak (*Quercus* sp.) at La Michilía, Durango (Morón 1981; Morón and Deloya 1991). The following developmental times (captivity) were recorded by Morón and Deloya (1991): 26–35 days from egg to 1st instar; 30 days (September) from 1st to 2nd instar; 46–80 days (October or November) from 2nd to 3rd instar; 180–200 days (May of the following year) from 3rd instar to pupation; 34 days from pupation to adult emergence. Morón (1991) showed that larvae that do not have adequate humidity and decomposing wood delay their development and emerge as adults in the second year of development. The larva and pupa for *R. durangoana* were described by Morón and Deloya (1991).

In his original description of the species, Ohaus (1905) stated that the female was unknown. However, the label data from the lectoallotype specimen are identical to that which he gives in the original description, and the label indicates that the specimen is a female. Thus, Ohaus may have added a female specimen to the original type series, or he may have misidentified the gender of the specimen prior to publication, correcting the label at a later date.

*Rutelisca flohri* Bates  
(Figs. 1, 2b, 3a–b, g, 4b, 6)

*Rutelisca flohri* Bates 1888: 270–271, 408.

Types.—Lectotype male (here designated) at BMNH labeled “Type” (with red circle), “Sp. figured,” “Durasnal,” “Mexico, Salle Coll.,” “1157,” “*Rutelisca flohri*

Bates ♂” (handwritten), [on back of type label “*Chalcentris* nov. sp. apnd [sic] Salle” (handwritten)], “B.C.A. Col. II (2).” Lectoallotype female (here designated) at BMNH labeled “Type” (with red circle), “Sp. figured,” “Durasnal,” “Mexico, Salle Coll.,” “*Rutelisca flohri* Bates ♀” (handwritten), “B.C.A. Col. II (2),” here designated. Two paralectotypes (1 male, 1 female) at MNHN labeled “Omiteme, Guerrero, 8,000’, July, H.H. Smith,” “*Rutelisca flohri* Bates” (handwritten), “H.W. Bates Biol. Cent. Amer.,” and my paralectotype labels. Three paralectotypes at ZMHB labeled “Mexico, Atlapango” (1 male) and “Amecameca, Flohr Coll.” (1 male, 1 female) with my paralectotype labels.

Description.—Length 12.2–17.8 mm. Width at elytral humerus 5.1–8.4 mm. *Color*: Dorsally black with orange-brown maculae; macula at base of frons with anterior edge rounded (reduced in female), at lateral margins of pronotum (absent in female, occasionally reduced in male), at bases of elytra (absent in female), at apices and lateral margin of elytra (absent in female, occasionally reduced in male). Ventrally dark brown to black. Appendages dark brown to black with poorly defined, orange-brown maculae; macula on dorsal face of profemora (absent in female, occasionally absent in male) and dorsal surface of protibia (absent in female, occasionally absent in male). *Head* (Fig. 2b): Frons with disc and mid-base moderately densely punctate, laterally and apically with confluent punctures to rugose; punctures 0.03–0.15 mm. Clypeus confluent punctate or rugose; shape narrowly parabolic (sinuate laterally converging toward acutely rounded apex), margins reflexed; base and sides moderately reflexed, apicomediaally broadly reflexed. Mandible with 1 apical, recurved tooth; 2–3 inner scissorial teeth (poorly developed); molar region narrow. Labrum rounded apically. Maxilla with 4–5 weak, peg-like teeth; palpus with terminal segment kidney bean-shaped (male) or oval (female), with well-developed dorsal flattened area from

base to apical  $\frac{1}{3}$  or  $\frac{1}{4}$  (Fig. 3g). Mentum with apex quadrate, width of apex about  $\frac{1}{2}$  width of base. *Pronotum*: Closely shagreened, moderately densely punctate; punctures 0.02–0.08 mm. *Elytra*: Closely shagreened, with poorly defined punctate striae (not reaching apex or base); 1 next to suture, 4 on disc, 4–5 laterad of humerus; punctures minute–0.07 mm, some elongate. *Pygidium*: Closely shagreened with close, weakly undulating wrinkles or weak rugae from base to apex. Apex with moderately long to long setae; setae tawny to rufous. *Venter*: Sternite 5 at apex with broad intersegmental membrane, membrane about  $\frac{1}{3}$  to  $\frac{1}{2}$  width of sternite 5. Sternite 6 subequal in length to sternite 4. Last sternite with surface weakly, undulatingly wrinkled to weakly rugose; apical margin setigerous; setae tawny, moderate in length. *Legs*: Pro-tarsomere 5 of male subequal to tarsomeres 1–4. Modified foreclaw of male (e.g., Fig. 3e) widely split apically; subequal in length to tarsomere 5; twice as thick as unmodified claw; apical tooth present. Modified foreclaw of female widely cleft (e.g., Fig. 3f); claws subequal in width. Unguitractor plate laterally flattened, exposed beyond tarsomere 5; apex with 2 long, stiff, tawny setae. Mesotibia (e.g., Fig. 3d) with sides subparallel, apex weakly divergent; external edge with weak carina in basal  $\frac{1}{2}$  (may be obsolete), 1 carina in apical  $\frac{1}{3}$ ; apex with 1 median tooth-like projection (apex extends to about  $\frac{1}{4}$  tarsomere 1), 2 inner spurs, with 4–5 seta-like spinulae between spur and median tooth, 2–3 spinulae laterad of median tooth; spinulae short to long, rufous. Meso- and metatarsal claws of male and female widely cleft. Metatibia (Fig. 3b) with sides subparallel; external edge with 1 carina in basal  $\frac{1}{2}$  and 1 carina in apical  $\frac{1}{3}$ ; apex without corbel, with 2 inner spurs (spurs equal in width in male; ventral spur thicker than dorsal spur in female), with 7–10 seta-like spinulae; spinulae short or long, rufous. *Parameres*: Fig. 4b.

**Diagnosis.**—The following characters will serve to distinguish *R. flohri*: punctate

elytral striae present (Fig. 1) (lacking in *R. durangoana*), terminal segment of the maxillary palp with a dorsal, longitudinal flattened area that extends from the base to the apical third or fourth (Fig. 3g) (extends from the base to the middle of the segment in *R. durangoana* [Fig. 3h]), male with dorsal maculae present on frons, lateral margins of pronotum, bases of elytra, and apices of elytra (Fig. 1) (male of *R. durangoana* with maculae only on frons), female with dorsal macula on the frons (macula lacking in *R. durangoana*), and clypeal apex that is narrowly parabolic (Fig. 2b) (apex broadly parabolic in *R. durangoana* [Fig. 2a]).

**Distribution** (Fig. 6).—Central Mexico south to Oaxaca. I have examined 4 types (see locality data under type data) and 43 other specimens from the following localities: MEXICO (47). COAHUILA (1): Saltillo (questionable locality data) [1 ♂ MCZC]. DISTRITO FEDERAL (3): Mexico City [1 MNHN], Mexico City (40 km S) [1 USNM], San Angel [1 MAMC]. GUERRERO (6): Atoyac de Alvarez [1 MAMC], Tlaxcopec (Puerto del Gallo) [1 MAMC], Omilteme [1 ♀ CNCI, 2 ♂ 1 ♀ BMNH]. MEXICO (6): Amecameca [1 ♂ 1 ♀ ZMHB], Atlapango [1 ♂ ZMHB], Real de Arriba [1 ♂ CNCI, 1 ♂ BMNH], Valle de Bravo [1 MAMC]. OAXACA (3): Santiago Tejaman (7.4 km N) [1 ♂ HAHC], Juchatengo (20 mi. S, Rt. 131) [1m HAHC], no data [1 ♂ BMNH]. VERACRUZ (18): Córdoba [9 ♂ 9 ♀ MNHN]. NO DATA (10).

**Temporal distribution.**—May (1), June (2), July (7), September (1).

**Remarks.**—Morón et al. (1997) collected adults of *R. flohri* in pine-oak forests; he encountered adults during the day, in soil, under rotting bark, in rotten logs of pine and oak, and occasionally at lights. The species is recorded at elevations ranging from 1,500 to 2,560 meters. One male specimen with label data “Saltillo, Coahuila” is problematic because it is disjunct from other known populations of *R. flohri* (occurring in the Sierra Madre Oriental rather than

in the Transverse Volcanic Belt or Sierra Madre del Sur). The locality data on this specimen are suspect (indicated with a question mark on Fig. 6). Larvae are not known for this species.

Genus *Metapachylus* Bates 1889

(Figs. 2c, 3c, 4c, 5, 6)

*Metapachylus* Bates 1889: 412.

Type species: *Metapachylus sulcatus* Bates 1889: 412–413, by monotypy.

Description.—Scarabaeidae, Rutelinae, Rutelini. *Form* (Fig. 5): Elongate oval, sides subparallel, pygidium exposed beyond apices of elytra, apex of elytra broadly rounded. Length 15.0–24.0 mm; width at mid-elytra 8.0–12.0 mm. *Head* (Fig. 2c): In lateral view, base of frons slightly convex, base of clypeus slightly convex, margins and apex reflexed. Frons and clypeus variably sculptured, punctate or rugose. Frontoclypeal suture complete, weakly bisinuate. Eye canthus weakly cariniform. Interocular width about 5.0 transverse eye diameters. Clypeal apex rounded, reflexed, lacking bead. Mandibles with 1 apical, recurved tooth; inner scissorial region with 3 teeth; molar region narrow in width, poorly developed. Labrum rounded or quadrate apically. Maxilla with teeth saber-shaped (at apex), peg-shaped (on disc), and conical (on disc); palpus with terminal segment twice length of penultimate segment, ovoid, with dorsal longitudinal flattened area (surface shagreened). Mentum with apex reflexed into oral cavity. *Pronotum*: Widest at base, basomedially weakly protuberant, basolaterally feebly arcuate anteriorly. Variably sculptured, punctate or rugopunctate. Marginal bead complete anteriorly and laterally, incomplete basally (to slightly beyond basal angle). *Scutellum*: Wider than long, shape parabolic. Base declivous at elytral base. *Mesepimeron*: Apex entirely hidden by base of elytra in dorsal and lateral views. *Elytra*: Sulcate, longitudinal, punctate striae on disc and laterad of humerus. Intervals with sparse, random punc-

tures. Epipleuron from base to mid-metacoxa with shelf; epipleuron from mid-metacoxa to apex beaded. Apex broadly rounded, beaded. Apex of sutural angle weakly rounded. Elytral sutural length about 6.5 times length of scutellum. *Propygidium*: Exposed. *Pygidium*: Shape semitriangular, about twice as wide as long at middle. Surface variably sculptured, punctate, rugose, or strigulose. Margins beaded. Apex rounded or weakly quadrate. *Venter*: Prosternal keel triangular; apex projecting anteroventrally at about 25° with respect to ventral plane; apex produced to level of protrochanter, blunt; basomedially protuberant; surface punctate, setigerous. Mesometasternal keel lacking. Sternites 1–4 subequal in width; sternite 5 at apex with broad intersegmental membrane, membrane about ¼ to ¾ width of sternite 5. Sternite 6 about ½ length of sternite 4. In lateral view, male sternites flat, female sternites weakly convex. Last sternite with apex weakly bisinuate in male and female. *Legs*: Profemur with rounded, weakly dilated apex (e.g., Fig. 3a). Protibia with 3 teeth in apical ½, basal tooth weakly removed from apical teeth; base with protibial notch. Protarsomere 5 of male subequal in length to tarsomeres 1–4. Modified foreclaw of male sharply curved and widely split apically (Fig. 5), subequal in length to tarsomere 5, 3–4 times as thick as unmodified claw; apical tooth present or absent. Modified foreclaw of female widely cleft; claws subequal in width. Unguitractor plate weakly cylindrical, exposed beyond tarsomere 5; subapex with 1 long seta; apex with 1 short, stiff seta; setae rufous. Mesotibia with sides subparallel, apex divergent; external edge with 2 weak carinae; apex without corbel, with 1 median tooth-like projection extending to about ¼ length of tarsomere 1, 2 inner spurs (ventral spur slightly thicker than dorsal spur in female), 8–10 seta-like spinulae between spur and median tooth, 2–4 spinulae laterad of median tooth; spinulae short to long. Meso- and metatarsomere 4 with 2 spinulae apicomediaally and 1 seta-



Fig. 5. *Metapachylus sulcatus* (male).



Fig. 6. Distribution of *Rutelisca* and *Metapachylus* in Mexico and Guatemala (inset).

like spinule laterad of spinulae. Meso- and metatarsal claws of male and female widely cleft. Unguitractor plate of mesotarsi laterally flattened, apex with 2 setae. Metacoxal apex at lateral edge square. Metatrochanter with apex not produced beyond posterior border of femur. Metatibia (Fig. 3c) with sides subparallel, apex divergent; external edge carinate; apex without corbel, with 2 inner spurs (ventral spur slightly thicker than dorsal spur in female), 8–12 seta-like spinulae at apex; spinulae short to long. *Parameres*: Symmetrical (Fig. 4c).

**Diagnosis.**—Members of the genus *Metapachylus* differ from other genera in the tribe Rutelini by the following characters: mandibles with one, apical, recurved tooth (Fig. 2c); mentum with apex reflexed into oral cavity; frontoclypeal suture complete and base of clypeus raised (pseudocarinate); apex of metatibia with spinules (Fig. 3c); elytra sulcate (Fig. 5); profemur with rounded, weakly dilated apex (e.g., Fig. 3a); protibial base with notch (e.g., Fig. 3a);

meso- and metatarsi with modified claws of male and female widely cleft (Fig. 5).

**Distribution** (Fig. 6).—Guatemala.

**Natural history.**—*Metapachylus* species are known only from cloud forest habitats.

**Remarks.**—Bates (1889: 412) described the genus *Metapachylus* and placed it in an “unindicated group of genera,” assigning it to neither the Rutelinae nor Dynastinae. In the text of the description, Bates commented that the genus *Metapachylus* shared characters with genera *Ottokelleria* (= *Pachylus*), *Oryctomorphus*, *Parastasia*, *Didrepanephorus*, *Peperonota*, and *Rutelisca*. Results of recent phylogenetic analyses (Jameson 1998) corroborate Bates’ hypothesis. The genus *Metapachylus* is most closely related to the genus *Rutelisca*. The clade (*Rutelisca* lineage) is apical to a clade that includes *Fruhstorferia* (subtribe Fruhstorferiina), *Kibakoganea* (subtribe not indicated, but probably Fruhstorferiina), *Ceroplophana*, *Dicaulocephalus*, and *Peperonota* (all in the subtribe Parastasiina). Apical

to the "*Rutelisca* lineage" is either a clade composed only of the genus *Parastasia* (primarily Old World with one species in the New World) or a clade composed of the Old World genera *Rutelarcha*, *Cyphelytra*, and *Lutera* (all in the subtribe Parastasiina). To resolve relationships of the basal Rutelini, additional analyses that include such genera as *Ottokelleria*, *Alvarengius*, *Desmonyx*, *Mesystoechus*, *Pseudogeniates* (genera not included in Jameson [1998]), *Oryctomorphus*, and genera of Heterosterina are needed.

*Metapachylus sulcatus* Bates  
(Figs. 2c, 3c, 4c, 5, 6)

*Metapachylus sulcatus* Bates 1889: 412–413.

Types.—Lectotype male (here designated) at BMNH labeled "Type" (round with red circle), "Sp. figured," "Tepan, Guatemala. Conradt," "Metapachylus sulcatus Bates ♂" (in Bates' handwriting), "B.C.A. Col. II (2)," here designated. Lectoallotype female (here designated) at BMNH labeled "Type" (round with red circle), "Sp. figured," labrum and maxillary palp carded [missing right maxilla], "Tepan, Guatemala. Conradt," "4/7.87 25. ♀," "Metapachylus sulcatus Bates ♀," "B.C.A. Col. II (2)," here designated. Lectoallotype missing left foretarsomeres, right mesotarsi, and metatarsi. One syntype not located.

Description.—Length 16.5–21.4 mm. Width at elytral humerus 8.9–11.1 mm. *Color*: Dorsum shining black with or without tan or tan-orange maculae; maculae on disc of frons (at mid-apex) and clypeus (on disc) in male (absent in female), maculae on pronotal margins in male (absent in female), maculae on elytral base laterad of scutellum in male (absent in female). Venter and appendages castaneous to black with tan maculae; suffused maculae on margins of prosternum, maculae on anterior edge of legs in male (absent in female). *Head* (Fig. 2c): Frons moderately densely punctate (base) to confluent punctate (apex and

margins), some punctures on sides setigerous; punctures 0.02–0.05 mm; setae moderately long, brown. Clypeus rugopunctate; shape semicircular, apices and margins moderately reflexed. Mandible with 1 apical, recurved tooth; scissorial region with 3 teeth; molar region narrow, poorly developed. Labrum rounded apically. Maxilla with 6 teeth; apical-most tooth saber-shaped, 2 teeth peg-shaped (on disc), 3 teeth conical (on disc); palpus with terminal segment oval, with dorsal, longitudinal flattened area from base to apical  $\frac{1}{3}$ . Mentum with apex quadrate, width at apex about  $\frac{3}{4}$  width of base. *Pronotum*: Moderately densely punctate; punctures 0.01–0.05 mm, midline with a weak, longitudinal sulcus. *Elytra*: Longitudinal, sulcate, punctate striae; 6 on disc mesad of humerus, 4 laterad of humerus; punctures 0.07–0.10 mm, some longitudinal (Fig. 5). Intervals with sparse, random punctures; punctures minute–0.02 mm. *Pygidium*: Base weakly, closely rugose; apex and sides weakly, closely strigulose. Apex and sides with moderately long to long, brown setae. Apex rounded. *Venter*: Sternites 1–4 subequal in width; sternite 5 at apex with broad intersegmental membrane, membrane about  $\frac{1}{4}$  to  $\frac{1}{2}$  width of sternite 5. Sternite 6 about  $\frac{1}{3}$  length of sternite 4. In lateral view, male sternites flat, female sternites weakly convex. Last sternite weakly bisinuate at apex; surface weakly strigulose, setigerous; setae moderately long, brown (female) or rufous (male). *Legs*: Profemur with rounded, weakly dilated apex (e.g., Fig. 3a). Protibia with 3 teeth in apical third of tibia, basal tooth weakly removed from apical teeth; base with protibial notch (e.g., Fig. 3a). Protarsomere 5 of male subequal to tarsomeres 1–4. Modified foreclaw of male sharply curved and widely split apically (Fig. 5); subequal in length to tarsomere 5; 3–4 times as thick as unmodified claw; apical tooth absent. Modified foreclaw of female widely cleft; claws subequal in width. Unguitractor plate weakly cylindrical, exposed beyond tarsomere 5; subapex with 1 long



seta, apex with 1 short, stiff seta; setae rufous. Mesotibia with sides subparallel, apex divergent; external edge with weak carina in basal  $\frac{1}{2}$ , 1 carina in apical  $\frac{1}{3}$  (Fig. 3c); apex with 1 median tooth like projection extending to about  $\frac{1}{4}$  tarsomere 1, 2 inner spurs, 6–7 seta-like spinulae between spur and median tooth, 2–4 spinulae laterad of median tooth; spinulae short to long, rufous. Unguitractor plate of mesotarsi laterally flattened, with 2 setae at apex. Metatibia with sides subparallel, apex divergent; external edge with 1 carina in basal  $\frac{1}{2}$ , 1 in apical  $\frac{1}{3}$ , and small carinae at middle and base; apex without corbel, with 2 inner spurs, with 8–10 seta-like spinulae; spinulae short or long, rufous. Apex of metatibia in female with ventral spur weakly thicker than dorsal spur. Unguitractor plate of metatarsi laterally flattened, with 2 setae at apex. *Parameres*: Fig. 4c.

Distribution (Fig. 6).—Guatemala. I have examined 2 types (see locality data under type data) and 2 other specimens from the following localities: GUATEMALA (4). CHIMALTENANGO (1): Tepan [1 ♂ 1 ♀ BMNH]. QUETZALTENANGO (1): Quetzaltenango (8 km SW Zunil, 2,700 m) [1 ♀ KSEM]. SAN MARCOS (2): Tumbador [1 ♀ ZMHB].

Temporal distribution.—January (1), April (1), June (1).

Remarks.—One female of *M. sulcatus* was collected by Steve Ashe and Rob Brooks (University of Kansas) from a rotten log on the ridge line of Cerro Zunil. According to Ashe and Brooks (personal communication 1994) this locality was a high, cold, rainy, cloud forest located on nearly vertical slopes. The understory was composed primarily of bamboo. The area surrounding this locality was largely deforested, and the only area to remain intact was seemingly protected by steep slopes.

Bates described this species based on three specimens. One male syntype was not located. It should be labeled with the same locality and collector data as the lectotype

and lectoallotype (“Tepan, Guatemala. Conradt”).

#### ACKNOWLEDGMENTS

I thank the curators, collections managers, and individuals listed in the “Taxonomic Materials” section for their loan of specimens and for their assistance. Angie Fox (University of Nebraska State Museum) provided the excellent carbon dust illustrations. I thank Brett Ratcliffe, Andrew B. T. Smith (University of Nebraska State Museum), and two reviewers for critically reviewing the manuscript. Partial support for completion of this research was provided by a University of Kansas Graduate Student Summer Fellowship, the University of Kansas Department of Entomology and Snow Entomological Museum, and the University of Nebraska State Museum.

#### LITERATURE CITED

- Arnett, R. H., Jr., G. A. Samuelson, and G. M. Nishida. 1986. The Insect and Spider Collections of the World. E.J. Brill/Flora and Fauna Publ., Gainesville, Florida, 220 pp.
- Arrow, Gilbert J. 1907. XLI. Some new species and genera of lamellicorn Coleoptera from the Indian Empire. *Annals and Magazine of Natural History* (series 7) 19: 347–359.
- Bates, Henry W. 1888. Pectinicornia and Lamellicornia. In Godman and Salvin, eds., *Biologia Centrali Americana*. Insecta, Coleoptera, Vol. 2, Part 2: 1–336.
- . 1889. Pectinicornia and Lamellicornia. In Godman and Salvin, eds., *Biologia Centrali Americana*. Insecta, Coleoptera, Vol. 2, Part 2: 337–432.
- Blackwelder, R. E. 1944. Checklist of the coleopterous insects of Mexico, Central America, the West Indies and South America. Part 2. *Bulletin of the United States National Museum* 185: 189–341.
- Burmeister, H. C. C. 1844. *Handbüch der Entomologie*. (Coleoptera Lamellicornia Anthobia et Phyllophaga Systellochela), Vol. 4: 1–588. Berlin.
- Jameson, M. L. 1990. Revision, phylogeny, and biogeography of the genera *Parabyrsopolis* Ohaus and *Viridimicus* (new genus) (Coleoptera: Scarabaeidae: Rutelinae). *Coleopterists Bulletin* 44: 377–422.
- . 1998 (1997). Phylogenetic analysis of the subtribe Rutelina and revision of the *Rutela* generic groups (Coleoptera: Scarabaeidae: Rutelinae: Ru-

- telini). Bulletin of the University of Nebraska State Museum 14: 1-184.
- Lacordaire, J. T. 1856. Histoire Naturelle de Insectes. Genera des Coléoptères ou Exposé Méthodique et Critique de Tous les Genres Proposés Jusqu'ici dans cet Ordre d'Insectes. Contenant les Familles de Pectinicornes et Lamellicornes. Vol. 3: 1-594.
- Machatschke, J. W. 1972. Scarabaeoidea: Melolonthidae, Rutelinae. Coleopterorum Catalogus Supplementa. 66: 1-361.
- Miyake, Y. and R. Muramoto. 1992. On the ruteline beetles of the genus *Kibakoganea* Nagai from northern Vietnam (Coleoptera: Scarabaeidae). Lamellicornia 7: 21-31.
- Morón, M. A. 1981. Los Coleopteros lamellicornios de la Reserva de la Biosfera "La Michilía." Durango, Mexico. Folia Entomológica Mexicana 81: 209-283.
- . 1994. La diversidad genérica de los Coleópteros Melolonthidae de Mexico. Acta Zoologica Mexicana (n.s.) 61: 7-19.
- Morón, M. A. and C. Deloya. 1991. Los coleopteros lamellicornios de la Reserva de la Biosfera "La Michilía", Durango, Mexico. Folia Entomol. Mexicana 81: 209-283.
- Morón, M. A., B. C. Ratcliffe and C. Deloya. 1997. Atlas de los Escarabajos de Mexico. Coleoptera: Lamellicornia. Vol. 1, Familia Melolonthidae. Subfamilias Rutelinae, Dynastinae, Cetoniinae, Trichiinae, Valginae y Melolonthinae. Sociedad Mexicana de Entomología, A. C., Mexico, 280 pp.
- Nagai, S. 1984. Two new May-beetles of the genus *Fruhstorferia* from Malaysia, with the description of a new subgenus (Coleoptera: Scarabaeidae). Transactions of the Shikoku Entomological Society 16: 25-31.
- Ohaus, F. 1905. Beiträge zur Kenntniss der amerikanischen Ruteliden. Stettiner Entomologische Zeitschrift 66: 283-329.
- . 1918. Scarabaeidae: Euchirinae, Phaenomerinae, Rutelinae. Coleopterorum Catalogus 20: 1-241.
- . 1934. Coleoptera Lamellicornia. Fam. Scarabaeidae, Subfam. Rutelinae. Genera Insectorum, Fasc. 199A: 1-172.